

### **REMARKS/ARGUMENTS**

This response is accompanied by a request for a two month extension of time. Accordingly, it is respectfully submitted that this response is timely filed.

In the Office Action, the Examiner rejected all of the claims as being obvious of Hakka (United States Patent No. 5,019,361). The Examiner stated that the difference between the applicant's claims and Hakka is that applicant's claims 1 and 11 require that the level of heat stable salt in the aqueous absorbing medium is adjusted so that the pH of the regenerated absorbing medium is at a level of six or less. The Examiner effectively stated on page 4 of the detailed action that this difference would have been obvious to persons of ordinary skill in the art. The Examiner noted that according to '361 Hakka, the pH of the aqueous absorbing solution should range from 4 – 7.5 during the absorption process and adjusting the pH of the absorbing solution to a value of six or less would render it ready and useful for the absorption process. The Examiner relied upon *in re Wertheim* to note that overlapping portions of a range claimed in an application and in the prior art is *prima facie* obvious.

The applicant has carefully considered the rejection raised by the Examiner and respectfully submits that the invention as claimed herein is patentable over '361 Hakka. As noted by the Examiner, '361 Hakka states that the pH of the absorbing medium is in the range of about 4 to about 7.5 during the absorption process. (Column 8, lines 66 – 68). However, the paragraph referred to by the Examiner continues to state the "usually the absorbing medium initially has a pH close to the upper end of the range, preferably about 6.5 to about 7.5 ...". Accordingly, the teaching of the '361 patent is that the pH of the absorbent at the beginning of the absorption step is greater than 6.

In contrast, the instant application relates to the steam stripping process (i.e. the regeneration step". For example, in paragraph 22, it is stated that "preferably, the absorbent is maintained at the desired pH, or pH range, during all, or at least essentially all, of the regeneration step so as to achieve the selected dissolved SO<sub>2</sub> level. The selected pH level is preferably less than 6, more preferably less than 5 and most preferably less than 4.5)" (emphasis added). Accordingly, the pH range of less than 6

which is referred to by the applicant in claim 1 relates to the pH during the steam stripping process and not the pH of the absorption step as referred to in '361 Hakka.

Accordingly, the applicant has amended claim 1 to specify that the pH of the aqueous absorbing medium during the steam stripping process is at a pH of 6 or less. Accordingly, the regenerated absorbent will have a pH less than 6.5 as referred to in '361 Hakka (column 9, line 2). Accordingly, contrary to the statement made on page 4 of the detailed action by the Examiner, the applicant respectfully submits that there is no specific overlap of '361 Hakka and claim 1 since claim 1 specifies the pH range during the steam stripping process and '361 Hakka specifies that the preferred pH of the absorbent at the beginning of the absorption step is greater than 6.5.

In addition to the forgoing, the application respectfully points out that claim 1 not only specifies that the pH is less than 6 during the steam stripping process, but that the level of heat stable salt is adjusted to maintain the pH below this level. The applicant respectfully submits that the Examiner has not argued that '361 Hakka teaches utilization of the heat stable salt level to control the pH during the steam stripping process. Accordingly, the applicant respectfully submits that claim 1, and the claims dependent thereon, are not obvious over '361 Hakka as applied in the Office Action dated August 28, 2006.

In addition to the forgoing, claim 7 is directed at an absorbent which utilizes diamines. If the absorbent includes a diamine, then claim 7 specifies that the aqueous absorbing medium has a heat stable salt concentration of greater than one equivalence of acid per mole of diamine prior to the lean aqueous absorbing medium contacting the sulphur dioxide containing gas. Accordingly, prior to the regenerated diamine contacting the sulphur dioxide containing gas, one of the diamines (the stronger diamine) has associated therewith the anion of a heat stable salt and accordingly the neutralized amine will not be available for absorbing sulphur dioxide. The applicant respectfully submits that the Examiner has not explained how '361 Hakka teaches this limitation.

With respect to claims 8 – 10, these claims specify that a pH level during the steam stripping step of less than 6 (5.5 or less in the case of claim 8 and 5 or less in the case of claims 9 and 10). The applicant respectfully submits that the Examiner has not

explained how '361 Hakka teaches these limitations with respect to the steam stripping step.

The applicant has also inserted new claims 31 – 32 which depend from claim 1. Claim 30 specifies that the amine absorbent has an amine with a lower pKa and an amine with a higher pKa and the aqueous absorbing medium has a stable salt concentration to neutralize the amine with the higher pKa prior to an aqueous absorbing medium contacting the sulphur dioxide containing gas.

Claim 31 specifies that the absorbent has a diamine and that the stronger amine and a portion of the weaker amine are neutralized by heat stable salts prior to the lean aqueous absorbing medium contacting the sulphur dioxide containing gas.

Finally, new claim 32 specifies that the heat stable salt concentration of the lean aqueous absorbing medium prior to contacting the sulphur dioxide containing gas is selected to be from 1.03 to 1.7 equivalents of acid per mole of diamine.

Claim 11 specifies that the level of heat stable salts in the aqueous absorbing medium is adjusted to maintain the pH of the regenerated aqueous absorbing medium at 6 or less. As argued above with respect to claim 1, the applicant respectfully submits that the Examiner has not explained in the rejection how '361 Hakka teaches the step of utilizing the heat stable salt level in the aqueous absorbing medium to maintain the pH of the regenerated aqueous absorbing medium at 6 or less. In addition, the applicant respectfully submits that the Examiner has not explained how '361 Hakka teaches an aqueous absorbing medium having a pH less than 6 at the beginning of the absorption step since as stated at column 9, line 2, the preferred pH at the beginning of the absorption step is 6.5 – 7.5. Accordingly, the applicant respectfully submits that claim 11, and the claims dependent thereon, are patentable over '361 Hakka.

With respect to claims 13 – 15, each of these claims specifies a heat stable salt concentration of the lean aqueous absorbing medium contacting the sulphur dioxide containing gas. The applicant respectfully submits that the Examiner has not raised any argument or explained how '361 Hakka discloses the ranges set out in claims 13 – 15. In addition, with respect to claim 23, the applicant submits that the Examiner has not


explained how '361 Hakka teaches the pH level of 5 or less during the regeneration step.

In the detailed action, the Examiner stated that claim 24 was rejected as obvious over '361 Hakka (page 3, lines 1 – 2). However, the Examiner did not provide any detailed argument as to why '361 Hakka rendered claim 24 obvious. In particular, the applicant notes that in the bottom paragraph on page 3 of the detailed action, the argument raised by the Examiner was directed only at claims 1 and 11. In order to advance the prosecution of this application, the applicant has considered claim 24 and re-inserted a limitation in claim 24 that was cancelled during the prior amendment of the claim. In particular, the applicant has amended claim 24 to specify that the heat stable salt concentration is adjusted such that the heat stable salt concentration is sufficient to favour dissolved sulphur dioxide being in the form bisulfite in the steam stripping step.

As noted in the specification at paragraph 7, sulfite and bisulfite exist in an equilibrium reaction. Also, as noted in that paragraph, as the pH changes the ratio of sulfite and bisulfite will be affected. As sulfite is not generally removable by steam stripping (paragraph 18) adjusting the pH to become more acidic will result in sulfite converting to bisulfite (paragraphs 20 in Figure 1) which may be removed by steam stripping. The Examiner has not explained how '361 Hakka teaches this control mechanism.

In view of the forgoing, the applicant respectfully submits that the application is in condition for allowance and respectfully requests a timely Notice of Allowance be issued in this case.

Respectfully submitted,  
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